that Geber acquired some of his notions of chemistry from Egypt.

Several MSS., purporting to contain the writings of Geber, exist in various libraries in Europe; these were translated into Latin as early as the year 1529, and into English in 1678. We have reason to believe that the Latin translation was faithfully done, if the Arabic text be not corrupt. The work consists of four treatises:—(α) Of the search for Perfection, (β) Of the Sum of Perfection, (γ) Of the Invention of Verity, and (δ) Of Furnaces.

Geber was acquainted with the seven metals known to the ancients, and he regarded gold, silver, copper, iron, tin, and lead, as compounds of mercury with sulphur in different proportions. Gold and silver are the most perfect metals, and are composed of the purest mercury and sulphur; the other metals consist of less pure mercury and sulphur, but may be converted into gold and silver by purifying their constituents, and uniting them in different proportions. He also describes various chemical substances, among others the following. The carbonates of potash and soda were known to Geber, and were procured from the ashes of plants. Caustic soda was procured from the carbonate by heating its solution with quicklime, as in the present day. Common salt was purified by ignition, solution, and filtration, and the solution was afterwards evaporated, and the salt crystallised out. Nitrate of potash, or saltpetre, and chloride of ammonium, or sal ammoniac, were apparently common in Geber's time; as also were alum, borax, and green copperas, or protosulphate of iron. Geber procured nitric acid by distilling copperas, saltpetre, and alum, and he used the acid for dissolving silver, and when mixed with sal ammoniac for dissolving gold. He obtained nitrate of silver in the form of crystals, and noticed their fusibility. Various compounds of mercury are described, among others corrosive sublimate or chloride of mercury, cinnabar or sulphide of mercury, and the red oxide of mercury, in which, nearly ten centuries later, oxygen gas was discovered by Dr. Priestley. Geber also obtained sulphuric acid by distilling alum. He appears to have been acquainted with the various processes of distillation, sublimation, calcination, filtration, and many others; indeed, with almost all the processes practised by his successors during the succeeding eight or nine centuries.

It is probable that some of the processes described by Geber were worked out in the medical schools of Arabia, and were known shortly before his time; yet he was himself a patient worker, and often intersperses his descriptions of substances and processes with remarks on the method of experimenting, and the mode of thought most suitable for the studies which he describes. He has often been called the "Founder of Chemistry;" at least his works are the earliest with which we are acquainted, and he was venerated as Master alike by the alchemists and chemists of the Middle Ages.

Geber appears to have been acquainted with many chemical appliances. In the earliest translations of his works we find figures of various furnaces and forms of distillatory apparatus; one of them, not unlike a still now in use, is represented above. The greater number of vessels described and figured by Baptiste Porta in his treatise *De Distillationibus*, published in 1609, are to be found in the first Latin translations of the works of Geber.

G. F. RODWELL

THE ARCTIC EXPEDITION

THE following is the text of the reply of the Government to the deputation which recently had an interview with Mr. Lowe and Mr. Goschen:—

"11, Downing Street.

"Dear Sir Henry Rawlinson,—Mr. Goschen and I have carefully considered the documents which you have laid before us with regard to the proposed Arctic Expedition.

"We do not find in them anything which shows that there is any pressing reason why the expedition should be sent this year.

"We give no opinion as to the expediency of such an expedition at a future time, but we are clearly of opinion that it would not be right to send out a second scientific expedition precisely at the moment when the public revenue has to bear the main burden of the expenses of the operations intrusted to the Challenger.

"I believe it has been erroneously stated that the Challenger Expedition involves very little expense. That is not so. The cost has already been considerable, and nothing has been spared to insure success; there will further be an additional annual outlay for three years.

"Under these circumstances, we regret that we cannot recommend the sending an exploring party to the Arctic Ocean as a Government enterprise this year.

"Believe me, yours very truly,
"(Signed) "ROBERT LOWE.
"Sir Henry C. Rawlinson, K.C.B."

It is clear, we take it from this, that it only remains for the men of science to make out their case, and we believe that the Arctic Committee are fully alive to this. The *Daily News* in a leader has indicated what we had already ventured to suggest as the weak point of the appeal, namely that it was incomplete, and that many men of science knew nothing of the proposed expedition. But in doing this we had no intention to cast a slur upon the Geographical Society; on the contrary we think that that Society's action in this matter is one which the Royal Society could now follow with the greatest advantage to science, and which we hope it will follow.

In 1865 the Geographical Society begged the Royal Society to take the lead in this matter, but the Royal Society Council declined. In 1872 the Geographical Society again entreated the Royal Society to take the matter up, but again received a chilling reply to the effect that the Royal Society Council would be prepared to give advice when applied to by the Government.

The Geographical Society then did the next best thing. It applied to other leading scientific societies, and to some few scientific men for statements of results to be derived from Arctic exploration. These it received and laid before Government, without giving any undue prominence to purely geographical results.

It is clear, therefore, that it is now the duty of the Royal Society and the other societies at once to add their influence to the movement; let a joint committee be formed to report, if need be, to the various councils. In this way the knowledge posessed by all specialists ought to be made available for the common good, so that a complete statement may be forwarded to the Government in the summer to enable the officers of the expedition to be appointed in time to avail themselves of special training.

NOTES

THE recent fusion of the Ethnological and Anthropological Societies under the designation of "the Anthropological Institute of Great Britain and Ireland," not only did good service to science but has financially proved thus far so successful that the Report of the Council for 1872, to be presented to the members next Tuesday evening at the annual meeting, announces a handsome surplus income applicable to the reduction of liabilities incurred in former years. In this promising condition of financial prosperity it is all the more to be deplored that a serious dissension has arisen in the Council in reference to the nomination of a successor to Sir John Lubbock, who, to the universal regret of the members, vacates the presidential chair, under the pressure of parliamentary and other engagements. Touching this matter we have received a copy of a printed statement signed by Mr. Harris and seven other members of Council, which alleges that at a Council Meeting, held on the 17th of last month, Dr. Charnock was placed on the House List for 1873, but that at a succeeding Council Meeting of January 7, this nomination was rescinded and the House List recast with the substitution of Professor Busk as President in the place of Dr. Charnock. This recasting of the List is made a matter of protest, and the members of the Institute, with whom the final decision rests, are appealed to. We need hardly remark that this appeal is wholly *ex parte*. We understand that the explanation given by the majority of the Council is that the vote of January 7 was a surprise, and as such justified its re-consideration. Now of all our public associations which have for their aim the advancement of scientific truth, the Anthropological can least afford to suffer by internal dissension, and it is earnestly to be hoped that this difference of opinion on the subject of a successor to Sir John Lubbock will be amicably arranged at the forthcoming meeting. The more so as it bears so clearly on the face of it that the interests of science are not in question.

A Scheme is on foot for the establishment of a County College at Cambridge, and it seems likely to be successful. An address on the subject, with many influential signatures from among the masters, professors, and tutors of the University, has been presented to the Chancellor, the Duke of Devonshire. The County College is intended to combine and assist the efforts that are being made in the various counties of England to extend and raise the standard of middle-class education. The County College students would, as unattached students, be members of the University, but would be generally younger than the present undergraduates, and more strictly looked after. One qualification for admission would be a previous residence of two years in one or more schools accepted by the University, and the having passed the Junior Local Examination. The special branch of the college function would be to prepare teachers for the secondary schools throughout the country. The utmost expense for each student is estimated at 80*l*. per annum, with forty weeks' residence. The cost of the buildings is estimated at 20,000*l*., which it is proposed to raise by a joint-stock company. Besides other necessary accommodation, the building will contain separate bedrooms for 300 students.

The annual *conversazione* of the Midland Institute, which has now become one of considerable importance in Birmingham, was held on Tuesday and yesterday, and will be continued this evening, when all the exhibited objects will be thrown open to the students of the Industrial Department. The success of these meetings has considerably affected the prosperity of the Institute, which now adds the *prestige* of fashion to the more solid attractions of its educational usefulness.

We would draw attention to the further communications on the recent star-shower which we print this week. At the moment of going to press we have received another account of the display as it was seen at Mauritius, which we hope to print next week.

Prof. Humphry commenced his Lectures on Practical Anatomy, on Tuesday, January 14, at 9 A.M., and will continue them daily at the same hour till the 27th, after which they will be continued on alternate days. The course of Lectures on Anatomy and Physiology will be continued on Tuesday, January 28, at 1 P.M., and on Tuesdays, Thursdays, and Saturdays, at the same hour.

The study of Physiological Botany receives so little attention in this country compared with what it does in France and Germany, that we are very glad to see that the editorial staff of the *Quarterly Journal of Microscopical Science* has been strengthened by the addition of the name of Prof. Thiselton Dyer to those of Mr. J. F. Payne and Mr. E. R. Lankester; an earnest, we trust, that vegetable histology will assume the place it deserves in the programme of the magazine for the future. As a commencement, Prof. McNab of Dublin contributed to the January number an article on "Haustein's Researches on the Development of the Embryo in Monocotyledons and Dicotyledons," which will, we hope, stimulate our young botanists to further research in this little-worked field.

The Professor of Experimental Physics at Cambridge will lecture on Electrostatics and Electrokinematics during the Lent Term, in the Botanical Lecture-Room New Museum on Tuesdays, Thursdays, and Saturdays, at 12 A.M., beginning Feb. 1.

We are indebted to the Scientific Editor of *Harper's Weekly* for the following:—Prof. Marsh and party returned on December 7 from the Rocky Mountains and Western Kansas, where they had spent the preceding two months in geological researches. They bring back a large number of vertebrate fossils from the cretaceous and tertiary formations of the West, including many new and interesting mammals, birds, and reptiles. Among the treasures secured during the present trip was a nearly entire skeleton of *Hesperornis regalis* (the gigantic diving bird of the cretaceous), numerous remains of pterodactyls, and a second species of the peculiar genus of cretaceous birds with biconcave vertebræ (*Ichthyornis*). The remains indicate a bird rather larger than *Ichthyornis dispar*, Marsh, but of more slender proportions. It may readily be distinguished from that species by the sacrum, which is proportionally more elongated, and has the cup of the posterior vertebral face more deeply concave. This species Prof. Marsh called *Ichthyornis celer*, and the group of birds now represented by the two species constitute the family of *Ichthyornidæ*.

The work of Dr. Cowes, just published, upon the birds of the United States, includes a synopsis of the fossil forms supplied by Professor O. C. Marsh, who has made this branch of palæontology a special study. He enumerates no less than 29 species, to which number must be added several others discovered by Professor Marsh in his late trip to the Rocky Mountains. A single kind belongs to the woodpecker tribe, while two are raptorial and three gallinaceous, namely, three kinds of turkeys. Twelve are waders and eleven are swimmers.

We are very glad to see from a report in *Les Mondes* for January 2, and from a letter sent us by the Abbé Moigno, that his most praiseworthy scheme of popular scientific lectures, instead of being likely to come to an end for want of funds, has taken a new lease of life, and that the *Salles* are now in a fair way to become a permanent Parisian institution. The Abbé and his friends have most disinterestedly spent a large sum to establish the institution, and they deserve the very highest credit and every encouragement in their attempt to provide for the Parisians the means of the best scientific and literary education; for not only are there lectures and *conversazioni* on science, art, and literature provided every night for grown-up people, but the Abbé has inaugurated a series of classes on a comprehensive plan for the higher education of the young. We sincerely hope this wide scheme will be completely successful, and that by-and-by its good effects will be markedly perceptible.

Dr. T. Archer Hirst, V.P.R.S., F.R.A.S., President of the London Mathematical Society, and Assistant-Registrar in the University of London, is to be appointed Director of Studies in the Royal Naval College now being instituted at Greenwich.

Mr. W. Saville Kent has been appointed Curator of the Brighton Aquarium.

The Octopus in the Brighton Aquarium met with a sad fate on Jan. 7. Finding himself uncomfortable in a tank where he had been newly placed by the curator, he came out, in an unguarded moment, of the house of living oysters he had collected as a shelter round him. In this tank were several large specimens of spotted dog-fish. One of these fish, with the true 'cuteness of a sea-dog, immediately pounced upon the unsuspecting octopus, and swallowed him.—Another novelty has been introduced into the Brighton Aquarium, viz., the apparatus for carrying on salmon and trout hatching. The trout from the Trent are thriving splendidly.

Apropos of the preceding, Mr. J. G. George, of Nassau, Bahamas, describes in the *American Naturalist* for December 1872, a gigantic Octopus, measuring 10 ft. long, and each arm 5 ft., the weight being estimated at between 200 and 300 pounds. The monster was found dead upon the beach and bore marks of injury. Mr. George adds that this is the first specimen he has seen during 27 years' residence in Bahamas, although they are traditionally of immense size.

M. E. Reverchon, naturalist, of Briançon, Hautes Alpes, France, offers to supply or to complete collections of the plants of Dauphiny and the south of France.

The first ordinary meeting of the new Medical Microscopical Society will take place at the Westminster Ophthalmic Hospital on the 17th inst., at 8 o'clock, when the President, Mr. Jabez Hogg, will give an introductory address.

There has just died at Paris M. Olivier Charles Camille Emmanuel, Vicomte de Rougé, Professor of Archæology in the Collége de France, and keeper of the Egyptian Museum in the Louvre, aged upwards of 61 years. He was the most eminent of French Egyptologists.

Mr. F. J. Williamson has received a commission to execute a statue of Dr. Priestley, to be erected in Birmingham. It will be 8 ft. high, and in white marble.

A Company has been recently started in Glasgow for the manufacture of asbestos into steam packing, for which purpose it has been found to exceed in durability and general usefulness every other material hitherto employed. The company, we believe, intend to put this hitherto unworkable material to a variety of other uses, it having been found, the *Glasgow Herald* says, perfectly practicable to manufacture asbestos boats, tubs, boxes, waggon bodies, and even railway carriages.

Mr. Edward Thomas, F.R.S., late of the East India Company's Bengal Civil Service, has been elected corresponding member of the French Academy, for his contributions to Oriental numismatic archæology.

Dr. G. Ischermak, Director of the Imperial museum of Mineralogy of Vienna, has published a catalogue of the meteorites in the museum up to October 1, 1872. The collection is arranged according to the system of MM. G. Rose and Rammelsberg.

We learn from the *Athenæum* that Prof. A. C. Ramsay, of the Geological Survey of the United Kingdom, has been elected Associate of the Royal Academy of Science, Belgium.

The Institution of Civil Engineers has now been in existence fifty-five years, having been established on January 2, 1818. It was incorporated by Royal Charter on June 3, 1828, and the numbers of the several classes constituting the corporation on the 1st inst., were 16 Honorary Members, 759 Members, and 1,151 Associates, with a class of Students attached of 267, together 2,193. Ten years ago there were on the books 20 Honorary Members, 413 Members, 574 Associates, and 10 Graduates, together 1,017 of all grades. The class of Graduates was abolished in the year 1867, when the class of Students was instituted.

The Government have agreed to the request of the *Daily Telegraph* to grant Mr. George Smith leave of absence for the purpose of proceeding to the East in order to make further discoveries among the Assyrian ruins. The sum placed at Mr. Smith's disposal in the meantime by the proprietors of the *Telegraph* is 1,000 guineas, and they anticipate that within six months he will be able to accomplish much. Whatever relics may be the result of the excavations, will be presented to the British Museum.

An unusually large number of Journals connected more or less intimately with science, have been started this new year. One of them is the *Irish Hospital Gazette*, intended to fill up the place left vacant by the *Dublin Hospital Gazette*, and to be especially a medium for the investigations of the physicians and surgeons of Ireland. The first number is a good one, and we hope the journal will meet with encouraging support.

According to the correspondent of the *New York Herald*, an ingenious plan has been adopted by Prof. Agassiz's expedition for determining how far the submarine regions are pervious to light. A plate prepared for photographic purposes is enclosed in a case so contrived as to be covered by a revolving lid in the space of forty minutes. The apparatus is sunk to the required depth, and at the expiration of the period stated is drawn up and developed in the ordinary way. It is said that evidence has thus been obtained of the operation of the actinic rays at much greater depths than hitherto supposed possible.

The number for January 4 of the *Revue Scientifique* contains the translation of a long and remarkably clever paper by E. von Hartmann, the purpose of which is to show that the differences between the animal and vegetable kingdoms are very much fewer than is dreamt of in the most generally accepted philosophy, that these kingdoms ought not to be classed as subordinates, but as co-ordinates, and that there is great likelihood that plants are capable in some degree of sensation and perception.

Dr. Eugene Robert, in *Les Mondes* for January 9, ascribes the disappearance of the fallen leaves of autumn to multitudes of earth-worms, which drag them into their underground galleries by means of the crooked hairy appendages with which their foremost rings are provided.

The two principal articles in the *Revue Scientifique* for January 11, are a translation of part of Prof. Tyndall's recent work on "Glaciers and the Transformations of Water," and of Mr. J. Evans' paper on "The Alphabet and its Origin."

The two principal papers in the *Moniteur Scientifique Quesneville* are "On the Respiration and the Nutrition of Vegetables," by M. Ch. Blondeau, in continuation of three previous ones, and the eighth and conclusive paper by M. Emile, "On Anthracite and its Derivatives." M. Blondeau concludes from his inquiries that vital force is essentially the same, and manifests itself in similar effects, whether it animates vegetables or animals, and regards as a popular delusion the belief that plants decompose and restore purified to the atmosphere the carbonic acid which results from animal respiration.

The first annual report of the Society of Telegraph Engineers shows that it is prosperous, and is doing good work.

We have received a second edition of "A Catalogue of the Birds of Kansas," contributed to the Kansas Academy of Science, by Mr. F. H. Snow, Professor of Natural History and Meteorology, in the University of Kansas. It contains 282 entries and seems carefully compiled.

The *Memorie della Società degli Spettroscopisti Italiani* for September contains Father Secchi's paper on the Variations of the Solar Diameter, illustrated by a carefully drawn diagram. A translation of this paper is the first article in *Der Naturforscher* for December, most of the other articles being translations from the *Comptes Rendus*, *Poggendorf's Annalen*, the *American Journal of Science*, and the published proceedings of foreign societies.